Semantic Communications: Overview, Open Issues, and Future Research Directions

Year: 2022 | Citations: 506 | Authors: Xuewen Luo, Hsiao-Hwa Chen, Qing Guo

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Abstract

With the deployment of the fifth generation (5G) in many countries, people start to think about what the next-generation of wireless communications will be. The current communication technologies are already approaching the Shannon physical capacity limit with advanced encoding (decoding) and modulation techniques. On the other hand, artificial intelligence (AI) plays an increasingly important role in the evolution from traditional communication technologies to the future. Semantic communication is one of the emerging communication paradigms, which works based on its innovative “semantic-meaning passing” concept. The core of semantic communication is to extract the “meanings” of sent information at a transmitter, and with the help of a matched knowledge base (KB) between a transmitter and a receiver, the semantic information can be “interpreted” successfully at a receiver. Therefore, semantic communication essentially is a communication scheme based largely on AI. In this article, an overview of the latest deep learning (DL) and end-to-end (E2E) communication based semantic communications will be given and open issues that need to be tackled will be discussed explicitly.